

REMARKS

By the present Amendment, Applicant has amended claim 1 to more appropriately define the present invention and added new claim 15 to protect additional aspects of the invention. In making each of these amendments, no new matter has been added. As a result of this Amendment, claims 1-15 are pending with claims 12-14 being withdrawn from consideration as directed towards a non-elected invention.

In the Office Action, the Examiner rejected claims 1, 3, 5, and 7 under 35 U.S.C. § 103(a) as being unpatentable over Sugaya et al. (U.S. Patent No. 5,754,299); rejected claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. (U.S. Patent No. 6,091,075) in view of Takaoka (U.S. Patent No. 5,969,853) further in view of Sugaya et al.; and rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. in view of Takaoka further in view of Sugaya et al. further in view of Nishi (U.S. Patent No. 5,138,176). Furthermore, the Examiner objected to claims 2, 4, 6, and 8 as being dependent upon a rejected base claim, but indicated their allowability if rewritten in independent form. Applicant appreciates the indication of allowable subject matter in the present application.

Applicant respectfully traverses the rejection of claims 1, 3, 5, 6, and 9-11 under 35 U.S.C. § 103(a) because the Examiner has failed to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. (See M.P.E.P. §2143.03 (8th ed. 2001)). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available

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to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." (M.P.E.P. §2143 (8th ed. 2001)).

I. Claims 1, 3, 5, and 7

On page 2 of the Office Action, the Examiner rejected claims 1, 3, 5, and 7 under 35 U.S.C. § 103(a) as being unpatentable over Sugaya et al. Applicant respectfully traverses the rejection based on the following remarks.

Present independent claim 1 recites a method of measuring a displacement of an optical axis comprising, among other things, "a step of irradiating an evaluation mark having diffraction grating patterns ... and observing the evaluation mark by way of [a] projection optical system to obtain a brightness of an image of an area of the evaluation mark, the area including the diffraction grating patterns; and a step of measuring the displacement of the optical axis based upon the relationship between the brightness of the image of the area of the evaluation mark and a direction of the diffraction grating patterns of the evaluation mark."

In contrast to the present claimed invention, Sugaya et al. discloses an inspection apparatus based on images under a plurality of focus conditions formed by way of an optical system to be inspected, namely, using images under a plurality of defocal conditions, tendency in positional change or change of asymmetry between images is calculated so as to specify at least one of aberration condition and optical adjustment condition of the optical system to be inspected. Sugaya et al. at Abstract.

However, Sugaya et al. does not teach or suggest at least a step of irradiating an evaluation mark having diffraction grating patterns, as recited in claim 1. In the Office Action, the Examiner alleges that “Sugaya ... discloses a step of irradiating an evaluation mark having diffraction grating patterns, a *phase type wafer mark* [sic] *pattern*.” Office Action at page 2 (emphasis added). However, contrary to the Examiner’s allegations, Sugaya et al. discloses “protrusions (i.e., a phase pattern) ... disposed with a predetermined pitch on a surface mask Ms of a mask which is permeable to light.” Id. at col. 16, lines 62-64 and Fig. 7, and does not teach or suggest at least an evaluation mark having diffraction grating patterns, as claimed. Simply put, a mask with a phase pattern is not an evaluation mark having grating patterns.

Further, Sugaya et al. does not teach or suggest at least “observing the evaluation mark by way of [a] projection optical system to obtain a brightness of an image of an area of the evaluation mark, the area including the diffraction grating patterns,” as recited in claim 1. Sugaya et al. discloses “a chart in which integrated signal ΣV , which is obtained as signals V corresponding to the light intensity of the phase pattern image are integrated in a non-measurement direction S_a is plotted with respect to measurement direction S in order to explain asymmetry index β of the phase pattern image.” Id. at col. 16, line 65 - col. 17, line 3 and Fig. 8. However, Sugaya et al. does not teach or suggest at least the above-quoted step of claim 1.

Still further, at least because Sugaya et al. does not teach or suggest either the claimed element “an evaluation mark having diffraction grating patterns” or “observing the evaluation mark by way of [a] projection optical system to obtain a brightness of an image of an area of the evaluation mark, the area including the diffraction grating

patterns," it necessarily does not teach or suggest "a step of measuring the displacement of the optical axis based upon the relationship between the brightness of the image of the area of the evaluation mark and a direction of the diffraction grating patterns of the evaluation mark," as recited in claim 1.

Therefore, Sugaya et al. does not teach or suggest each and every element of claim 1. At least for this reason, the Examiner has failed to make a *prima facie* case of obviousness for claim 1 and the rejection of claim 1 under 35 U.S.C. § 103(a) is improper. Accordingly, Applicant respectfully requests the Examiner to withdraw the rejection of claim 1 under 35 U.S.C. § 103(a) and the claim allowed. Applicant submits that claims 1, 3, 5, and 7 are also allowable at least in view of their dependency from allowable claim 1.

II. Claims 9 and 10

On pages 2-3 of the Office Action, the Examiner rejected claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. in view of Takaoka further in view of Sugaya et al. Applicant respectfully traverses the rejection based on the following remarks.

Independent claim 9 recites an optical microscope comprising, among other things, "a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate."

In contrast to the present claimed invention, Shibata et al. discloses an automatic focus detection method comprising the steps of irradiating onto a single spot of a sample a plurality of beams of illuminating light transmitted and condensed through an

objective lens in a symmetrically diagonal manner with respect to an optical axis of the objective lens; branching reflected light from the same spot of the illuminated sample after transmission through the objective lens, in the directions of the beams of illuminating light; irradiating an optical image formed by a branch of the reflected light onto a photoelectric conversion device representing intensity distribution of the irradiated optical image; and detecting a defocus of the sample based on a discrepancy between the optical axis and the center of the light intensity distribution on the photoelectric conversion device. *Id.* at col. 2, lines 14-29.

However, Shibata et al. does not teach or suggest at least “a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate,” as claimed. In the Office Action, the Examiner alleges that “Shibata in a microscope with focus detection discloses ... a removable and rotatable shield means, field stops (col. 7, lines 40-65; col. 8, lines 1-45; Fig. 3).” Office Action at page 3. Applicant respectfully submits that the Examiner has mischaracterized the teachings of Shibata et al. in seemingly equating the field stop of Sugaya et al. and the claimed “a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate.”

Sugaya et al. discloses a light source 10 in an illumination optics 11. *Id.* at col. 7, line 61 and Fig. 3. Sugaya et al. further discloses a field stop 18 positioned in the *illumination optics 11* so that “the light past the field stop 18 may emit different kinds of ring-like illumination.” *Id.* at col. 8, lines 6-8 and Fig. 3. That is, the field stop 18 is

positioned in the illumination optics and is not “a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate,” as claimed.

Takaoka and Sugaya et al. fail to cure the deficiencies of Shibata et al., noted above. Specifically, Takaoka discloses an aperture element and an optical modulation element for creating an image having the detecting sensitivity of a phase contrast imaging technique. *Id.* at Abstract. Takaoka does not teach or suggest at least “a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate,” as claimed. Sugaya et al. also does not disclose at least the claimed element quoted above.

Therefore, Shibata et al., Takaoka, and Sugaya et al., either alone or in combination, fail to teach or suggest at least “a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate,” as claimed.

Further, in view of the failure of the cited references, either individually or in combination, to teach or suggest each and every element of Applicant's invention, it necessarily follows that there is no motivation to combine the teachings of the cited references. Likewise, there is no reasonable expectation of success in doing so.

At least because Shibata et al., Takaoka, and Sugaya et al., either alone or in combination, do not teach or suggest each and every element of claim 9, the rejection

of claim 9 under 35 U.S.C. § 103(a) is improper. Accordingly, Applicant requests the Examiner to withdraw the rejection of claim 9 under 35 U.S.C. § 103(a) and the claim allowed. Applicant submits that claim 10 is also allowable at least in view of its dependency from allowable claim 9.

Furthermore, while the Examiner admits that “[a]s for asymmetrical shield means, Shibata is silent,” the Examiner attempts to cure this deficiency by alleging that “Takaoka in an optical microscope teaches the use of symmetrical stops ... to vary contrast and light flux. Therefore, it would be obvious to one skilled in the art to have asymmetrical apertures in order to vary the contrast and flux.” Office Action at page 3. Applicant respectfully disagrees. First, contrary to the Examiner’s allegations, there is no motivation to combine the teachings of Takaoka, which is directed towards a phase contrast technique, with those of Shibata et al., which is directed towards an auto-focus system. Second, Applicant respectfully contests the Examiner’s assertion, as Applicant has already demonstrated herein that the cited references do not teach or suggest each and every element of Applicant’s invention. The Examiner’s statement is an unsubstantiated generalization of questionable relevance to Applicant’s claims. Applicant refers the Examiner to the February 21, 2002 Memorandum from USPTO Deputy Commissioner for Patent Examination Policy, Stephen G. Kunin, regarding “Procedures for Relying on Facts Which are Not of Record as Common Knowledge or for Taking Official Notice.” In relevant part, the Memorandum states, “If the examiner is relying on personal knowledge to support the finding of what is known in the art, the examiner must provide an affidavit or declaration setting forth specific factual statements and explanation to support the finding” (Memorandum, p. 3). Applicant

submits that the Examiner made a generalized statement regarding Applicant's claims without any documentary evidence to support it. Applicant traverses the Examiner's presumed taking of "Official Notice," noting the impropriety of this action, as the Federal Circuit has "criticized the USPTO's reliance on 'basic knowledge' or 'common sense' to support an obviousness rejection, where there was no evidentiary support in the record for such a finding." Id. at 1. Applicants submit that "[d]eficiencies of the cited references cannot be remedied by the Board's general conclusions about what is 'basic knowledge' or 'common sense'." In re Lee, 61 USPQ2d 1430, 1432-1433 (Fed. Cir. 2002), quoting In re Zurko, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Should the Examiner maintain the rejection after considering the arguments presented herein, Applicant submits that the Examiner must provide "the explicit basis on which the examiner regards the matter as subject to official notice and [allow Applicant] to challenge the assertion in the next reply after the Office action in which the common knowledge statement was made" (Id. at 3, emphasis in original), or else withdraw the rejection.

III. Claim 11

On pages 3-4 of the Office Action, the Examiner rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. in view of Takaoka further in view of Sugaya et al. further in view of Nishi. Applicant respectfully traverses the rejection based on the following remarks.

Claim 11 depends from independent claim 9. As discussed above regarding claim 9, Shibata et al., Takaoka, and Sugaya et al., either taken alone or in combination, do not teach or suggest at least "a removable and rotatable shield means provided at a

pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate," as recited in claim 9.

Nishi, cited merely for fiducial marks on a stage, fails to cure the deficiencies of Shibata et al., Takaoka, and Sugaya et al., noted above. As a result, Shibata et al., Takaoka, Sugaya et al., and Nishi, either taken alone or in combination, do not teach or suggest at least least "a removable and rotatable shield means provided at a pupil of [a] projection optical system and having a shield area, the shield area being asymmetric relative to normal light of the illumination light from a substrate," as recited in claim 9. Therefore, Shibata et al., Takaoka, Sugaya et al., and Nishi, either taken alone or in combination, do not teach or suggest each and every element of claim 11, which depends from claim 9. Accordingly, at least for this reason, the Examiner has failed to make a *prima facie* case of obviousness for claim 11, and the rejection of claim 11 under 35 U.S.C. § 103(a) is improper. Applicant respectfully requests the Examiner to withdraw the rejection of claim 11 under 35 U.S.C. § 103(a) and the claim allowed.

Further, while the Examiner admits that "Shibata in view of Takaoka and Sugaya ... are silent concerning a mark on the stage," the Examiner attempts to cure this deficiency by alleging that "it would have been obvious to one skilled in the art at the time of the invention was made to have an evaluation mark on the stage, for evaluation marks are formed on stages." Office Action at pages 3-4. Applicant respectfully disagrees. Applicant respectfully contests the Examiner's assertion as Applicant has already demonstrated herein that the cited references do not teach or suggest each and every element of Applicant's invention. At least because the cited references, either

taken individually or in combination, do not teach or suggest each and every element of Applicant's invention, it necessarily follows that there is no motivation to combine the teachings of the cited references. Likewise, there is no reasonable expectation of success in doing so.

Applicant submits that the Examiner made a generalized statement regarding Applicant's claims without any documentary evidence to support it. Applicant traverses the Examiner's presumed taking of "Official Notice," noting the impropriety of this action, as discussed above regarding claims 9 and 10. Should the Examiner maintain the rejection after considering the arguments presented herein, Applicant submits that the Examiner must provide "the explicit basis on which the examiner regards the matter as subject to official notice and [allow Applicant] to challenge the assertion in the next reply after the Office action in which the common knowledge statement was made" (Id. at 3, emphasis in original), or else withdraw the rejection.

New claim 15

New claim 15 depends from independent claim 9. For at least the reasons stated above regarding allowable claim 9, Applicant submits that claim 15 is allowable at least in view of its dependency from allowable claim 9.

Conclusion

In view of the foregoing remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

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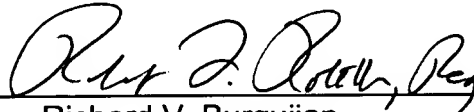
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Respectfully submitted,

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